



Deconstructing who you play: Character choice in online gaming

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ABSTRACT

The major growth in gaming over the last five to ten years has been through the expansion in online gaming, with the most frequent gamers now playing more games online than with others in person. The increase in cooperative multiplayer online gaming, where players who do not know each other come together in teams to achieve a common goal, leads to interesting social situations.

The research in this paper is focussed on the online multiplayer game Overwatch, in this game playable characters are grouped into a number of classes and characters within these classes. A player chooses the character at the start of a given round, and whilst they can change the character during the game round this is generally undesirable. In this research we were interested in how players go about selecting a character for a given round of the game, this is a complex interaction where a player has to balance between personal character preference (either a character they enjoy playing or is well-mapped to their playstyle and skill) and ensuring a team has a balance of player classes. The interaction is complicated by the online nature meaning it is difficult to reward a team-mate for selecting a character they may not wish to play or playing a character which may mean they will perform poorly but the team will win.

We recruited over 1000 Overwatch players and surveyed them on how they make their character choices within the game, they were also asked to complete various psychometric tests. We found that a gamers player 'type' (i.e. Killer, Achiever, Explorer or Socialiser) was defined by their agreeableness and their gender. We also found that player's choice of character class was related to their level of agreeableness and extroversion modulated by the player's gender. We also found that those who rate highly in conscientiousness and agreeableness and are socialisers or achievers were more likely to choose a character in order to achieve a balanced team rather than personal preference.

The research is unique in the scale and number of respondents, it also addresses a problem in co-operative gaming where players must negotiate the composition of a team. This negotiation is often performed without any background knowledge of other player's skill levels, this is the first study at this scale considering this within the context of co-operative online gaming.

1. Introduction

According to recent research by Kleiner and Perkins [1] video games are rapidly becoming an intrinsic component of mainstream culture, with an estimated 2.6 billion gamers worldwide compared to only 100 million in 1995. Traditionally, gaming is associated with younger people however, Kleiner and Perkins found that average age of gamers was now 35 years old. This is further underlined in a survey by the Pew Research Center [2] that found that 49% of adults in America have played a video game, and 10% of those surveyed would describe themselves as 'gamers'. In addition to the amount of people playing games the way in which we are playing video games is also evolving. More and more people are playing online thanks to improved internet

connectivity and availability. A recent study by the Entertainment Software Association [3] suggests that the most frequent gamers now play games online for an average of 6.5 h per week, compared with only 5 h per week spent playing with others in-person.

What is perhaps not entirely obvious to a player of an online game is that the choices that they make within the virtual world can provide a reflection of themselves. In this paper we investigate what information about the personality of player can be obtained simply by analysing their choice of characters, and the reasoning behind these choices in a game called Overwatch [4].

Overwatch is an online multi-player game, with over 30 million unique players [5] across PlayStation, Xbox and PC platforms and won a number of 'Game of the year' awards in 2016. The game is a

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cooperative, team-focussed first-person shooter with each round a competition between two opposing teams of six players. The game is split into two different modes, quickplay which provides a casual gaming mode in which players are matched together based on a general skill level and competitive mode where players maintain a rank through each 3 month season. During competitive play, players on the winning team have their rank increased, whilst players on the losing team have their rank decreased. Hence, the individual decisions a player makes can directly impact on the success and failure of their team as a whole, and in competitive play effect the rankings of the players on the whole team.

Overwatch provides an interesting game to study since it is not only popular, but all of the game modes are inherently co-operative and team-based. This co-operative nature means individual players must interact not only with the game and the game environment but also interact with their team mates both during and before a given round. Individual players are rewarded (or penalised) based on the team performance, so there are inherent motivations to getting a successful team outcome—this makes Overwatch a particularly fascinating game to study.

Before each round commences the players decide which characters to play in order to stand the best chance of success. During the character selection screen players have no direct ability to influence a team-mates selection, although the game will give warnings if the team is dramatically unbalanced. Hence there needs to be a degree of self-awareness and ‘situational understanding’ in order to create a team that stands a chance of succeeding. Characters are split across four main classes, it is generally believed a good team involves a balance across these four classes, although as the game evolves the ‘meta’ changes and the ideal team balance tends to shift as new character synergies are identified (e.g. Pharah and Mercy). The characters a player can use within the game are split into the following four classes:

- **Offense** characters are highly mobile and able to do a large amount of damage, however they tend to be relatively fragile and unable to sustain large amounts of damage.
- **Defense** characters are designed to protect particular locations and create strategic ‘choke points’ or ‘kill boxes’.
- **Tank** characters tend to be slow and able to sustain a large amount of damage whilst dealing a moderate amount of damage, most have some ability to shield either themselves or others.
- **Support** characters are able to do small amounts of damage, however their primary role is to heal or enhance their team mates abilities or weaken those of their opponents.

A player’s character selection can have a significant impact on the team’s success or failure, this leads to a challenging situation where some players will be trying to influence another’s choice of character. However, they may have no evidence of a player’s skill or the ability to reward them for playing a character they may not wish to play. In this paper we focus on the decisions that players make during character selection and the reasoning behind these decisions. We then look at how these decisions can be influenced by an individual player’s personality traits including their openness to experience, conscientiousness, extroversion, agreeableness, neuroticism, self-monitoring and perfectionistic self-presentation.

The remainder of this paper is structured as follows. In Section 2 we provide a brief discussion of the related work, Section 3 provides the hypotheses that have driven this work. Section 4 gives an overview of the method used to collect this data, in Section 5 we provide an analysis of the results of the research. Section 6 goes on to discuss the implications of these findings and finally, Section 7 draws conclusions from our findings and discusses the potential for future work in this area.

2. Background

A number of authors have speculated that there are positive effects of online gaming [6] even in violent games [7], although there is some evidence of psychological effects in niche hyper-violent games, particularly when experiencing taboo activities such as rape and torture [8]. However, the systematic review by Connolly et. al. [9] outlined a significant number of positive outcomes from gaming including affective and motivational outcomes, knowledge acquisition, perceptual and cognitive skills, motor skills, behaviour change, physiological outcomes and social/ soft skills outcomes.

Previous work has shown that it was possible to identify individuals based on how they played a game of Tetris [10]. The motivation for that research was that individuals have an innate set of traits and gaming skills that they display when playing a game. We would anticipate this to also be true in more complex games (although the complexity of the game might make it difficult to extract particular features from gameplay), however we would also expect these traits to have an effect on how an individual selects characters and builds a team before starting gameplay.

There are a number of approaches to assessing individual differences that allow one to describe the distinctive features of a person. One popular approach is a five-factor model derived from a wide review of the personality literature [11,12]. This identified five major personality factors that could be used to describe individual differences, these were Neuroticism, Extraversion, Openness to Experience, Conscientiousness and Agreeableness. This five-factor model uses broad constructs to summarise personality assessment and identify whether an individual ‘is chronically predisposed to emotional distress versus emotionally stable (Neuroticism); energetic and thrill-seeking versus sober and solitary (Extraversion); curious and unconventional versus traditional and pragmatic (Openness to experience); kind and trusting versus competitive and arrogant (Agreeableness); disciplined and fastidious versus laidback and careless (Conscientiousness).’ [13].

There is a large body of work focussing on the effects of personality on decision making particularly when related to tasks perceived to be high-risk or made under pressure, e.g. [14–16]. These studies often involve lab-based experiments of the task in which decision making is performed, we are interested in the manifestation of these effects in cyberspace and in our particular case within online competitive games. We hypothesise that assessing the effect of personality on decision making within the same context as the decisions making process occurs would allow our data to more accurately map to the decision making that actually goes on during game play.

There has been a significant volume of research considering the motivation individuals have for playing games and the original paper by Bartle [17] in the mid-90s is the seminal work on the topic. He broke down gamers in multi-user dungeon games into four discrete player types based on how they interact with other players and the game itself. These player types he described as ‘Killers’ who wished to act on other players (i.e. kill or attack); ‘Socialisers’ who wish to interact with other players; ‘Achievers’ who wish to act on the virtual world (i.e. achieve within the game context) and ‘Explorers’ who wish to interact with the virtual world (i.e. explore, manipulate or customise the virtual world). Other work [18] has looked to identify other motivations and player types, however we have taken Bartle’s simple breakdown of player types as they map well with the cooperative, task-orientated nature of Overwatch.

Brain Hex [19] was one of the first attempts at mapping personality types to gaming motivation archetypes, this created a larger number of gaming archetypes and identified some correlations with the Mayers-Briggs psychotypes to these resulting archetypes, this was done across a number of different games and gamers were asked to consider an abstract situation to consider their gaming archetype. In our research we ground the study to one particular game and provide a tangible space in which the gamer can consider their play archetype.

Previous work on the relationships between personality traits and gaming has typically focused on the personality and behaviour of players in massively multiplayer online role-playing games (MMORPGs). Collins et al. [20] conducted a study with 225 participants (66 of whom played MMORPGs), where they were asked to complete an online questionnaire. The work showed that low levels of functional impulsivity and agreeableness alongside high levels of verbal aggression and video game dependency were associated with greater amounts of time spent playing MMORPGs. The study also analysed problematic and non-problematic MMORPG players and found that the problematic players were lower in self-regulation, dysfunctional impulsivity and agreeableness. The work highlights the traits that are likely to be the most significant when developing and maintaining MMORPGs, a different genre of game to that considered in our project.

Similarly, Worth and Book [21] investigated the personality traits of players, again considering MMORPGs. Their work focused specifically on *World of Warcraft*, an MMORPG with a large user base (Statista [22] reports in excess of 5 million subscribers in 2018). Worth and Book's work is similar to our own in that participants were asked to complete a number of personality measures questionnaires, albeit with notably fewer participants (205) than our study and a different genre of game. The personality measures that were used included: HEXACO [23], which is a model of personality that is similar to that used in our own work (the Big Five [12]). The most notable difference between the two measures is that HEXACO includes an Honesty-Humility factor that covers the desire to be sincere and fair at one end of the spectrum and deceitful and manipulative at the other end. Additionally, their work analyses any connections between psychopathy and in-game behaviours. The study looked at six components (derived through Principle Components Analysis [24]) and how they correlated to the various personality traits (for example, their work found that player-versus-player was linked to psychopathy).

In addition to research around personality traits and their link to gaming there has also been research that focuses on online identity, which is similar to that of our own work. Kaye et al. [25] conducted a study that looked at the role of gamer identity and online social capital as mediators of online gaming engagement and psychosocial outcomes (self-esteem, loneliness and social competence). Their work focused specifically on Massively Multiplayer Online (MMO) players with an online questionnaire with 708 respondents. The results highlighted that gamer identity (a concept that goes beyond virtual and offline identities and communities) related positively to self-esteem, social competence and negatively with loneliness. This illustrated a range of positive psychological outcomes associated with MMO engagement.

There has been previous research on the effect of personality on negotiation in both face-to-face and computer mediated communications for example Crossley et. al. [26]. Historically there has been a consensus that individual differences played little part in negotiation, but there is an increasing body of work that proves this might not be true [27]. Within cooperative gaming there is often a computer-mediated negotiation surrounding the choice of characters and team composition, this is particular the case in *Overwatch* where a player's outcomes are dependent upon the character choice of others and there is little ability to reward or influence another player's choice.

One of the more unique elements of *Overwatch* is the expanding range of characters and the impact that this selection has on the game itself. Dill and Thill [28] present a related study to our own that analysed the opinions of young people around video game characters of different genders and found that they related strongly to traditional stereotypes. For example, male characters were viewed as aggressive whereas female characters were sexually objectified. This was a view that was also held by non-gamers. Our own research looks at character selection within *Overwatch* and relates this to the characteristics of the player.

3. Hypothesis

The research in this paper considers three main hypotheses about how *Overwatch* is played and the modulating effects of personality upon those choices. These hypotheses were synthesised from the academic literature surrounding personality, decision making and gaming outlined in Section 2.

- H1: The player type is dependent on the player's openness to experience, extroversion and self-monitoring.** *Overwatch* is a co-operative game and hence we would expect most players to be 'achievers', particularly those who rate highly on self-monitoring who would tend to be able to moderate their behaviour to achieve the required goal. However, those who rank high on openness to experience will tend to have an increased desire for variety and hence will be more likely to be 'explorers'. Those who rank highly in extroversion are likely to be more outgoing and hence wish to 'act on' other players and we would expect them to be 'killers'.
- H2: Those who rate highly for conscientiousness, agreeableness and self-monitoring will strive for a balanced team rather than personal character preference.** Those who rate highly on conscientiousness will tend to be more organised and dependable and as such will sacrifice their choice for the 'good-of-the-team', whilst those who rate highly on agreeableness will tend to be more submissive and are likely to switch to ensure a balanced team before those who rate lower on that scale. Individuals who are high self-monitors are typically more sensitive to social and situational cues and more likely to alter their behaviour accordingly. Given that individuals who score high on self-monitoring tend to consider their social surroundings prior to acting we might expect them to be more considerate of how others would view them.
- H3: The choice of character class will be dependent on a player's extroversion and conscientiousness.** Individuals who rate highly on extroversion will tend to be more attack-focussed, 'care-free' characters (such as Genji or Tracer) while those who rate more highly on conscientiousness will tend to play more support roles (such as Lucio or Mercy).

There may be similarities between H1 and H3, however H1 relates to an individual's motivations - i.e. what they want to get from the game. H3 relates to how an individual goes about achieving that within the game context. For example, a 'Killer' player type could use a fast-paced Attack character such as Tracer or a slower Tank character such as Reinhardt and we might expect this choice to reflect some trait.

4. Method

In order to answer these research hypotheses we created a survey that could be completed online. The survey began with a consent form and continued with simple biographic questions such as gender and age. It then asked for the player's favourite character, and the reason for this being their favourite character.

The next section was concerned with the process that an individual goes through when deciding what character to play for a given round. This was a 'slider' from 0 to 100, with 0 indicating personal preference through to 100 representing the team balance. In order to ascertain the type of player (Achiever, Socialiser, Killer or Explorer) the respondent was asked to rank the following four statements *...to show what is most important to you whilst playing Overwatch, the most important factor should be at the top*.

- Socialising and working with others as a team
- Winning games and gaining achievements
- Customising your character and exploring new routes around a map
- Killing other players and getting the 'Kill of the game'

Once this background information had been collected we proceeded to use a number of personality scales to gather estimates of the respondents' traits. We used the Big-5 [29] (a version designed to be delivered in web-based scenarios), Snyder's self-monitoring scale [30] and then finally the perfectionistic self-presentation scale [31].

The research received Ethical approval from Cranfield University Research Ethics team (reference CURES/3566/2017), the study was piloted with six individuals in order to identify any questions that were ambiguous and ensure that there were no errors or omissions within the survey. These six pilot individuals were removed from the final data set.

This survey was circulated to the Overwatch community through social-media, a number of Overwatch forums and through the very active Reddit communities at r/Overwatch, r/OverwatchUniversity, r/OWConsole and r/wholesomeoverwatch. Respondents were entirely voluntary and no compensation was offered, however one participant was randomly chosen to receive a 40 voucher for the gaming platform of their choice (XBox Live, PSN or Steam). The study ran for one week from 16th October 2017, and hence represents a snapshot of the game at that time.

This led to 1328 respondents who had completed the start of the survey, 1171 who completed the Big-5 scale, 1074 who completed the self-monitoring scale and 1010 who completed the perfectionistic self-presentation scale. Cronbach's alpha [32] measure of internal consistency of the psychometric scales is shown in Table 1. As can be seen all measures exceed 0.7 with a good number exceeding 0.8, suggesting a good level of internal consistency among the sample. The data has been made available as an auxiliary dataset [33].

5. Analysis and results

From within the respondents we found a good mixture of ages, with 15% of the respondents being over 30, although the game is rated PEGI-12 (i.e. suitable for those over 12 years old) one of the requirements for the study was that the respondent was over 18. Around 16% of the respondents were female, there were similar distributions in the age between the two genders. The distribution of the players ages and gender are shown in Fig. 1 and the platform upon which the respondents play are shown in Fig. 2. As can be seen the majority of our respondents are playing on a PC rather than a console.

We used the ranking of the statements outlined in Section 4 in order to capture a respondents player type as outlined in Bartle's classic work [17]. This split all players down into four categories: Achievers, Explorers, Socialisers and Killers, whilst this was originally within the context of multi-user dungeon games, it has application in other gaming environments [34,35]. The rankings of respondent's reasons for playing are shown in Fig. 3 as can be seen over 90% of respondents ranked Achiever or Socialiser as the top motivation for playing Overwatch.

In order to explore the characteristics that predict the player types we created a multinomial logistic regression model, the input variables were chosen to maximise the number of significant coefficients. The model was created with respect to the Achiever class and the model that resulted in the most significant coefficients is shown in Table 2.

Table 1

The consistency of the psychometric measures amongst the respondents.

Measure	Cronbach's Alpha	Consistency
Non-display of Imperfection	0.8733195	Good
Extroversion	0.8719249	
Perfectionist Self Promotion	0.8712545	
Neuroticism	0.8682152	
Conscientiousness	0.8233160	
Nondisclosure of Imperfection	0.7909414	Acceptable
Agreeableness	0.7502507	
Openness	0.7200624	
Self-Monitoring	0.7159852	

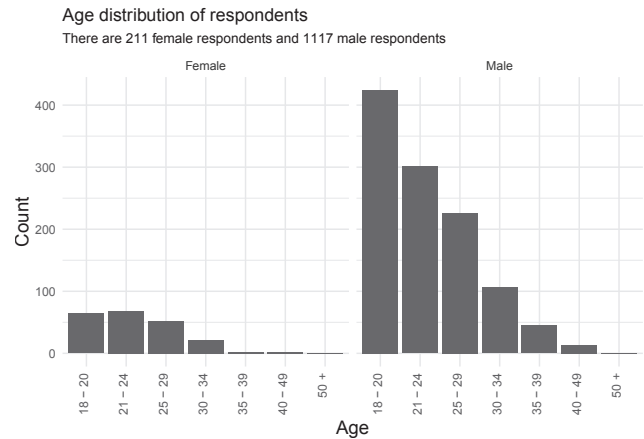


Fig. 1. The distribution of the respondents ages.

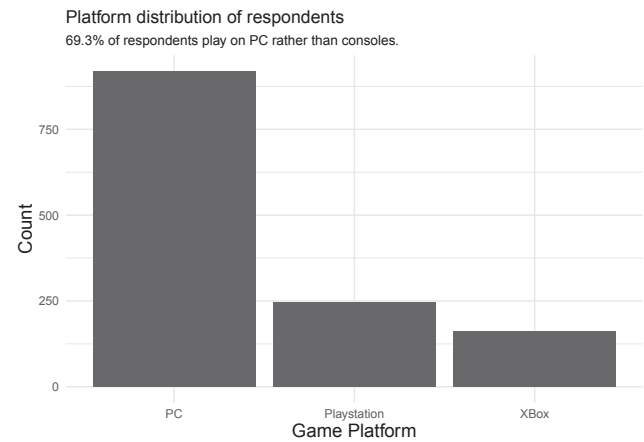


Fig. 2. The distribution of the platforms upon which the respondents play Overwatch.

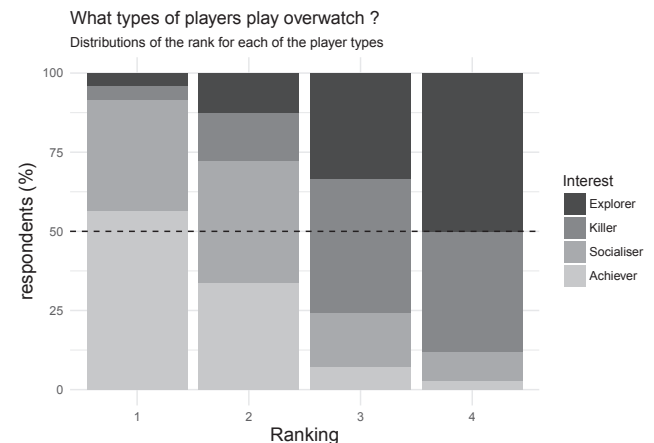


Fig. 3. The ranking of the various player types.

Table 2

The multinomial logistic regression coefficients for the player types (w.r.t. Achiever class). Significance levels are denoted such: '****' ≤ 0.001 , '***' ≤ 0.01 , '**' ≤ 0.05 and '*' ≤ 0.1 .

Player type	(Intercept)	Agreeableness	Gender (Male)
Socialiser	-2.271420**	0.57343369***	-0.6089139***
Explorer	-1.529850	-0.07280363	-1.1181139**
Killer	-1.389483	-0.48975448*	0.6851915

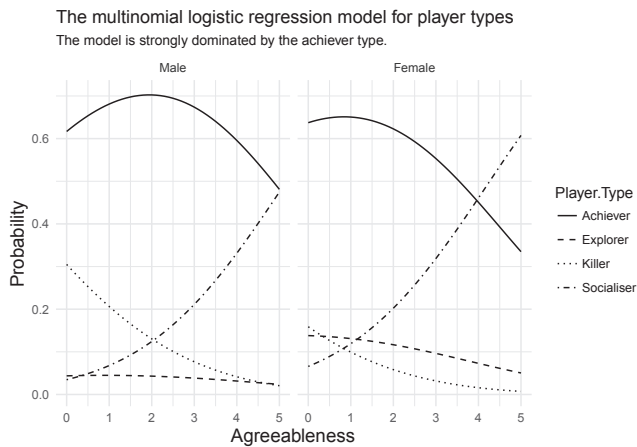


Fig. 4. The model for an individual player type.

The model is shown graphically in Fig. 4, as can be seen for high-levels of agreeableness the model is generally a balance between the Achiever and Socialiser types. For male players with low-levels of agreeableness, there is a high probability of the Killer player type. For female players with lower levels of agreeableness there is a fairly even distribution between the other three classes.

We were interested in how participants choose a particular character per round. There is generally a choice between two factors, the first is personal preference: different characters and classes have different styles that individuals will either enjoy playing or match to their particular level of ability or skills. The second factor is team balance, in this case players will sacrifice playing a character they may want to play in order to ensure a team balance and improve the whole team's chance of success (potentially at the expense of their own enjoyment or personal success). This can be a contentious set of decisions [36] particularly as there is no mechanism to reward players for choosing a character they may not enjoy playing, and decisions at this stage can have a large effect on the success of the team as a whole.

The distribution of the balance between these two factors is shown in Fig. 5, as can be seen there is a bimodal distribution. With one mode around 35% and another around 75%, this indicates that all players make some form of trade-off and no players chose either 0 or 100. A linear regression model was created from all of the variables in the study and we followed a step-wise reduction process of removing the least significant term until all model coefficients are significant and there was no further reduction in the Akaike's Information Criteria [37]. The resulting model coefficients are shown in Table 3; to validate the model the respondents were split into two classes based on the bimodal distribution shown in Fig. 5 and a binomial logistic regression



Fig. 5. The distribution of how the player chooses a character for a given round.

Table 3

The regression coefficients for defining how people choose a character for a given round. Significance levels are denoted such: **** ≤ 0.001 , *** ≤ 0.01 , ** ≤ 0.05 and ≤ 0.1 .

	Linear Regression Coefficient	Logit Model Coefficient
(Intercept)	40.467***	−0.84272
Conscientiousness	3.261**	0.33273**
Agreeableness	4.873**	0.29082**
Socialiser	−5.014***	−0.40016***
Achiever	−3.528***	−0.29953***

was calculated using the same variables, this is also shown in Table 3. The response for this binary logistic model is shown in Fig. 6.

It is clear from both of these models that as conscientiousness and agreeableness increases so does the value that the individual puts on team balance. This is also increased by how high the individual ranks the Achiever and Socialiser player types. Note since these are rankings the value is inverted (i.e. a lower ranking indicates a higher 'value') and hence the coefficients are negative.

The distribution of the respondents' favourite characters is shown in Fig. 7, the shade of the bars represents the class to which the character belongs, as described in Section 1. The players' favourite characters are largely dominated by support and offense characters, with only D. Va (a high Damage Per Second (DPS) tank character that is often used in a similar manner to an Offense character) and Junkrat who is a defense character but has a quirky and entertaining character design. This distribution of characters is very non-uniform indicating that there are characters that are favoured significantly more than others.

Overwatch has a mixture of character genders with 11 of the 25 characters being female, and a number of commentators have noted the diversity of body types and ethnicity, most notably the characters Mei, Zarya and Ana [38,39]. From our dataset 49.8% of respondents' favourite characters were female, indicating an even distribution across male and female characters. It is worth noting that all of the characters are heroes (far from playing a 'damsel in distress' trope [40]) and although there are fewer female characters in the entire hero roster, 7 out of the 12 most popular characters were female. We were interested in whether this was modulated by the gender of the player. Male gamers tended to have a relatively even split across the character genders with slightly more male characters (46.0% had a female character as their favourite character), whilst 66.8% of female players had a favourite character who was female, this is similar to found by others [41]. A Pearson's Chi-squared test was used to check whether the gender of the favourite character was independent of the player's gender, this found a (X-squared = 30.18 and a p-value = 3.938e−08), indicating that the gender of a player's favourite character is not independent from their own gender.

We were interested in the effect that a variety of psychometric scales had on the class to which the favourite character belonged. A similar process was followed to create a multinomial logistic regression model to model the class of a players favourite character based upon the measured variables, the resulting model coefficients are shown in Table 4 and the model response is shown in Fig. 8.

As can be seen there is a clear trade-off between Support and Offense, with female respondents with high agreeableness and low extroversion very likely to play a support character and male respondents with low agreeableness and high extroversion very likely to play offense characters.

6. Discussion

From the results it is clear that the psychometric measures captured during the study have some effect on how individuals go about playing online cooperative games. We were also interested to note that the

Binary logistic regression model

As Agreeableness and conscientiousness increase then a player is more likely to choose a character based on team requirements

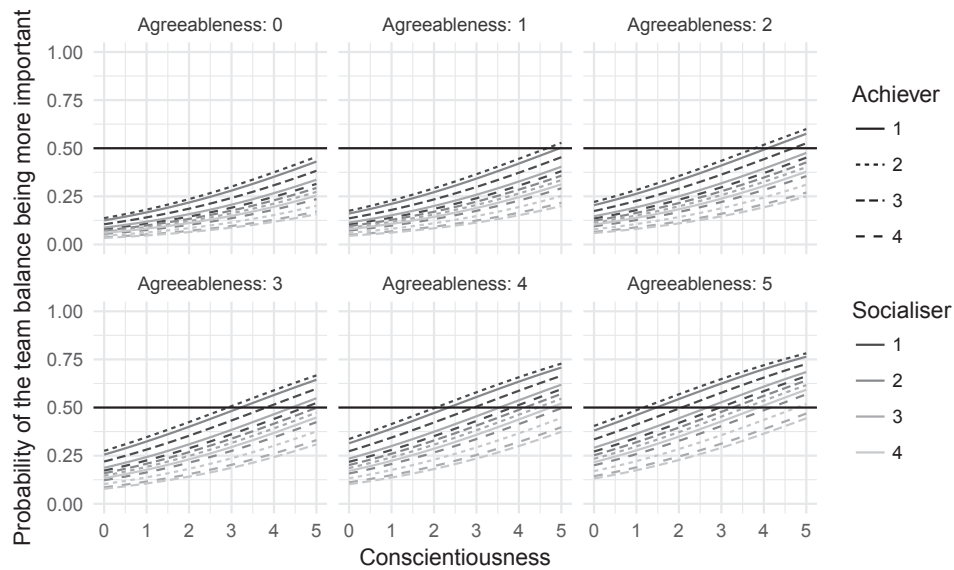


Fig. 6. The binary logistic model for how respondents choose a character for a given round.

Favourite Characters

Support characters and Offense characters tend to be the most popular.

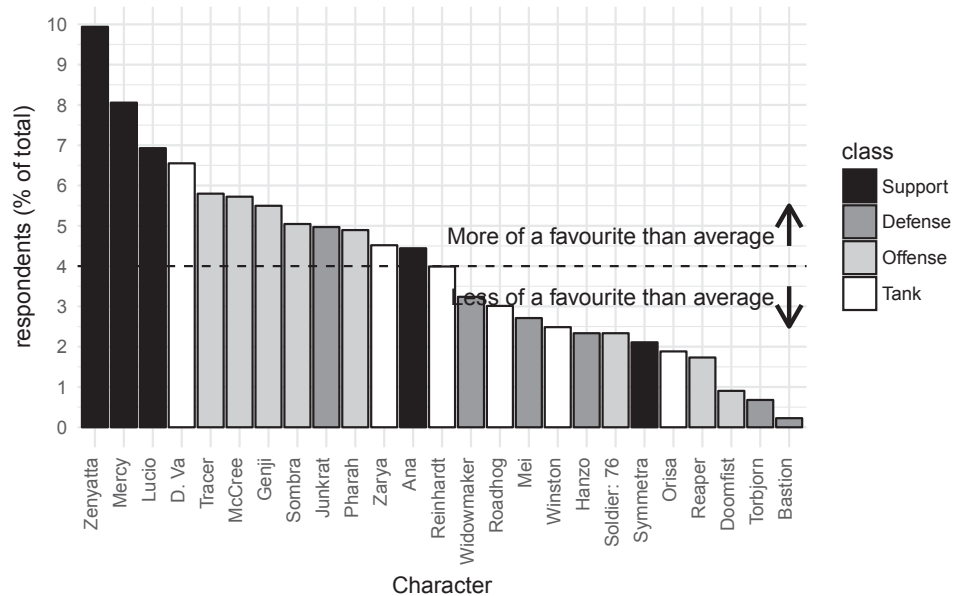


Fig. 7. The distribution of the favourite characters.

Table 4

The multinomial logistic regression coefficients for the favourite character's class (w.r.t. Support class). Significance levels are denoted such: **** ≤ 0.001 , *** ≤ 0.01 , ** ≤ 0.05 and ≤ 0.1 .

Class	(Intercept)	Agreeableness	Extroversion	Gender (Male)
Offense	0.1555452	−0.3802331**	0.2146329*	0.7703503***
Defense	−1.3548906	−0.1559755	0.2226548	0.6012652*
Tank	−0.7092552	−0.1221514	0.1319433	0.5350170*

player's gender was a moderating factor in two of the three models.

The first analysis looked to explore the player type (achiever, socialiser, explorer or killer), as seen in Fig. 4. Using a multinomial

logistic regression we were able to identify that the player type was well described by a player's level of agreeableness and their gender. In most gaming environments a larger number of players look to interact with the virtual world/ game and achieve within the game context. As a player's agreeableness increases they become more likely to be a socialiser and interact in a social manner with the other players, the increase in agreeableness leads to them becoming less focused on their own achievements.

For men who rate low on agreeableness there is a relatively high probability that the player will be a killer type, the lower level of agreeableness leading to a decrease in empathy and more 'selfish' play. The same occurs for female players however is much less pronounced—indicating much lower probability of being a Killer type. For female

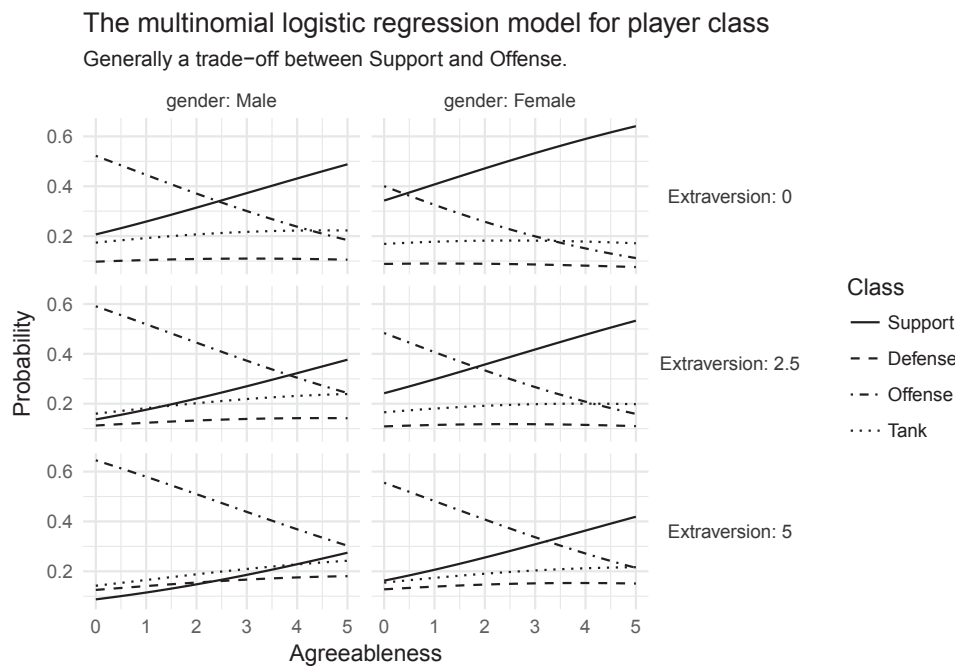


Fig. 8. The model for a players favourite class.

players the transition from Achiever to Socialiser occurs at a lower level of agreeableness, we hypothesise this is due to the increased tendency for social emphasis over tasked emphasis [42].

The next analysis considered how players make a choice about who to play for a given round, a linear regression model and a logistic regression model (with the two classes identified in the binomial distribution in Fig. 5) were created and the logistic regression model is shown in Fig. 6. Those who ranked highly on conscientiousness and agreeableness were more likely to be focused on team composition rather than personal preference. Those who rated highly in agreeableness are more likely to be altruistic and compliant whilst preferring deference as a means of resolving conflict [43], whilst those who rate highly in conscientiousness are more likely to consider their obligations to others when making decisions. It is clear how these two factors affect the character decision.

The final two factors were how highly the player ranked themselves as an Achiever and Socialiser game type, as the ranking increased so does the probability the player will aim for a balanced team. If the player is playing the game in order to work with others, achieve or succeed then it is consistent that they are more likely to choose characters to ensure a balanced team. Conversely, if a player ranks achievement and socialisation lower then they are less likely to be concerned about team composition and more likely to focus on personal success.

The next analysis considered the effect of personality on the choice of character class, (i.e. Support, Offense, Defense or Tank). From a multinomial logistic regression model we could see clear effects from agreeableness and extroversion modulated by the player gender, this was most clear in the Support and Offense classes. From the model coefficients we can see that a one point increase in agreeableness has almost twice the effect of a one point decrease in extroversion. As agreeableness increases the player is more likely to play support and less likely to play offense, this is consistent with those who rate highly on agreeableness generally being more altruistic and 'tender-minded' [43]. However as extroversion increases a player is more likely to play an offensive character, those who rate highly on extroversion are more likely to be energetic and forward leading, this again clearly maps to these offensive characters who tend to be fast with a high mobility and tend to reward a less cautious play style.

Again of note is the modulating effect that gender plays in this model, a switch to a male player has approximately the same effect as a two point drop in agreeableness. Women in general tend to rate higher on agreeableness and related aspects [44], this suggests that a similar amplifying altruism is captured in the gender factor, which is uncaptured in the measure of agreeableness. An alternative hypothesis is that some female players feel an obligation or pressure to fulfil the female gaming stereotype (the altruistic healer character) within a co-operative game, particularly if they feel they are an outsider in a gaming community [45].

Originally we had considered that there would be an effect from the perfectionistic self-presentation, particularly the non-disclosure of imperfection. However, we found no such significant effect within any of our analyses. We hypothesise that there is a balance for those who rate highly in non-disclosure of imperfection between avoiding personal displays of imperfection in the gameplay and displaying imperfection through creating a poor team through inappropriate character choice.

We had also hypothesised that there would be an effect from self-monitoring throughout the study, since those who rated higher on self-monitoring were able to better controlling their own behaviour in order to 'look good' in front of others. We had particularly expected to see this effect when choosing character classes or choosing a character in the team composition phase. However, no significant effect was observed in any of the analyses that were performed. There are a number of possible reasons for this, the first noteworthy point is that the internal consistency of this score is quite low at 0.716 (see Table 1), which whilst acceptable may mean this psychometric test is not capturing the underlying trait well. Alternatively, the online nature and lack of ability to easily negotiate the team composition may mean that those who are high self-monitors may not have the social cues available to them to be able to manage their own behaviour.

6.1. Limitations

As with all research there are a number of potential limitations to the study, the first is that this data was collected during a week of October 2017 and as such it represents a snapshot of the game balance and player preferences at that time. Most multiplayer online games have a series of updates which rebalance different characters and

weapons, as such this data represents the state (often referred to as the ‘meta’) during this week. A relatively short time period was used to ensure that the game ‘meta’ was constant during the data collection phase.

The research used a self-selected online study, this may lead to self-selection bias which potentially will mean those that are higher in conscientiousness or agreeableness may be more likely to respond [46], this bias may mean that some player types are over-represented in our sample.

Within a gaming context there is also the chance that proficient players are more likely to engage in online surveys relating to the game [47], since the survey was distributed through a number of online spaces where the game is discussed this also potentially skews the population away from the ‘casual’ gamer. This bias which may result in an under-representation of the ‘casual’ gamer and an over-representation of the more proficient or serious player may also be evidenced in the results surrounding the platform upon which Overwatch is played. Within the respondents there are significantly more PC gamers than console gamers, this may further indicate the under-representation of ‘casual’ gamers.

7. Conclusion

This paper has described a study considering the modulating effect of a variety of personality traits on how players select their characters in online multiplayer games. The research tackled the three research hypotheses outlined below:

- H1: **The player type is dependent on the player’s openness to experience, extroversion and self-monitoring.** We found a player type was defined by their agreeableness and gender.
- H2: **Those who rate highly for conscientiousness, agreeableness and self-monitoring will strive for a balanced team rather than personal character preference.** We found that the those who rate highly in conscientiousness and agreeableness and playing as a socialiser or achiever will be more likely to try to achieve a balanced team.
- H3: **The choice of character class will be dependent on a player’s extroversion and conscientiousness.** We found that the choice was dictated by a player’s agreeableness and extroversion in addition to their gender.

Whilst not all of our initial hypotheses were validated, all were modulated by personality traits. This indicated that personality traits are ‘leaked’ through how people play games. In addition the gender of the player had a modulating effect in nearly all models, indicating that there are differences in the way male and female gamers take part in the online gaming experience. Whether these differences are driven by the game itself or the environment constructed by the players [48] cannot be discerned from this study, however is an area of future interest.

There is evidence of personality affecting the decision-making process of these online gaming environments, in some areas there is also an effect for the motivation for playing the game, e.g. whether they are an Achiever, Socialiser, Killer or Explorer. We found no effect from either perfectionistic self-presentation or self-monitoring in the hypothesis.

Whilst the effect of personality may not be unexpected, the degree to which personality influences the challenging decision making around the team composition is interesting and it is clear that personality, particularly agreeableness and conscientiousness in combination with gender moderate a lot of these decisions. This is of interest to game developers who are looking to broaden the appeal of these games (of which Overwatch is a good example of a ‘progressive’ first-person shooter), hopefully leading to games that are more inclusive rather than games that target individual groups of gamers and hence further reinforce any gaming stereotypes [49,45]. In addition the study should be of interest to those players who are interested in how other players

make decisions during the character selection stage of team composition.

Appendix A. Supplementary data 1

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.entcom.2018.06.002>.

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